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(54) FLOOR SWEEPING MACHINE

(71) We, LEIFHEIT INTERNATIONAL GUNTER LEIFHEIT GmbH, a body Corporate organised and existing under the laws of the Federal Republic of Germany, of 5408 Nassau/Lahn, Federal Republic of Germany, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to floor-sweeping machines of the kind having a housing in which there is a roller brush rotatable by floor engaging wheels which are mounted in the housing adjacent the ends of the roller brush, the machine in use being moved over a floor to be swept in directions at right angles to the axis of rotation of the roller brush. The housing may have on its underside and provided with an aperture for the roller brush, a flap pivotable about an axis extending parallel with the axis of the roller brush and forming dirt collecting chambers in front of and behind the roller brush.

In one such previously proposed floor-sweeping machine, the flap serves merely to enclose the bottom of the housing and to form the dirt collecting chambers required in front of and behind the roller brush. The flap has thereby, in addition to the aperture for the roller brush, also apertures for the wheels which drive the roller brush by frictional engagement. The wheels and the roller brush are mounted on other parts of the housing, so that in the event of the flap being opened, the roller brush remains in the housing. Cleaning of the brush is not easy. Furthermore, the mounting of the roller brush in the housing is comparatively complicated, particularly if the roller brush is to be adjustable in its height in respect of the wheels or the housing in order that the machine is adjustable to different heights of pile in a carpet which is to be cleaned.

According to the invention there is provided a floor-sweeping machine, having a housing and a roller brush rotatable by floor-engaging wheels which are mounted in the housing adjacent the ends of the roller brush, the machine in use being moved over a floor to be swept in directions at right angles to the axis of rotation of the roller brush, the housing having on its underside a flap downwardly pivotable relative to the housing about an axis extending parallel with the axis of rotation of the roller brush, the flap having an aperture therein through which the roller brush projects and forming dirt-collecting chambers located one in front of and one behind the roller brush, with the roller brush rotatably mounted on the flap.

The floor-sweeping machine preferably has the features detailed hereinafter.

Thus, for mounting of the roller brush, two bearing journals are provided on the flap in a mutually facing relationship, which bearing journals engage in corresponding central recesses in the end faces of the roller brush. By means of these bearing journals the roller brush can particularly easily be mounted on the flap.

The bearing journals are secured on upwardly angled end parts of laterally projecting portions of the flap.

The laterally projecting portions with the angled end parts are integral with the flap which is made from sheet-metal. Thus, the flap with the laterally projecting portions and the angled end parts can be formed from a single piece of sheet-metal which is appropriately shaped to form the dirt-collecting chambers and, with the integrally formed projecting portions and the end parts which are angularly set thereon, it forms the mounting for the roller brush.

The bearing journals which are directed towards each other have stepped ends which are riveted into apertures in the end parts. This makes it possible for the flap to be produced particularly inexpensively.

The roller brush mounted on the flap is adjustable in height with respect to the housing. Thus the roller brush can be adapted to different heights of pile of a carpet to be cleaned,

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in that the flap with the roller brush, in the closed position, projects to a greater or lesser degree from the housing.

The pivot axis of the flap is at one end thereof and, in the closed position, the flap with the roller brush has its end opposite to said one end held against an abutment on the housing which permits of different height settings for the roller brush. According to the position of the abutment against which is held said end of the flap opposite to said one end, so the roller brush extends to different extents out of the plane of the floor-engaging wheels.

The flap carrying the roller brush has at said end opposite to said one end on an upwardly directed wall part thereof, a bearing surface which is inclined to a bottom face of the flap, while the abutment provided on the housing is displaceable. By reason of the displaceable abutment and the bearing surface on the wall part of the flap, the roller brush is particularly easily adjustable in its height.

The bearing surface which is inclined to the bottom face of the flap is formed by a tongue bent from said wall part of the flap. As a result, the bearing surface is formed in a particularly simple manner by a part of the flap.

The edge of the tongue where it is bent out of said wall part is inclined with respect to the bottom face of the flap.

The abutment provided on the housing is constituted by a magnet which co-operates with the tongue, which tongue is of sheet-metal. In consequence, it is easily ensured that the flap is held in the closed position and cannot open unless this is intended. The force of the magnet is overcome to open the flap.

The magnet co-operating with the tongue of the flap can be adjusted transversely in relation to the direction of forward movement of the floor-sweeping machine by means of a control device projecting from the top of the housing. Thus the flap and with it the roller brush can easily be adjusted in height from the top of the floor-sweeping machine.

A part of the control device is visible through a window in the top of the housing and indicates the height setting of the roller brush and of the flap with respect to the housing.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a perspective view of a floor-sweeping machine according to the invention equipped with rotary auxiliary brushes;

Figure 2 is a view of the underside of the floor-sweeping machine of Figure 1, one auxiliary brush having been removed;

Figure 3 is a section taken on line III—III of Figure 2;

Figure 4 is a section taken on line IV—IV of Figure 2 but showing both auxiliary brushes in position;

Figure 5 is a side view of the floor-sweeping machine of Figures 1 to 4;

Figure 6 is a plan view of the frame of the floor-sweeping machine of Figures 1 to 5;

Figure 7 is a section taken on line VII—VII of Figure 6 but showing parts not shown in Figure 6;

Figure 8 is a view of the underside of the frame of the floor-sweeping machine of Figures 1 to 7;

Figure 9 is a section taken on line IX—IX of Figure 8;

Figure 10 is a section taken on line X—X of Figure 8 but showing a closure cover not shown in Figure 8;

Figure 11 is a section on line XI—XI of Figure 8, with part broken away and including parts not shown in Figure 8;

Figure 12 is a section taken on line XII—XII of Figure 8, with part broken away and including parts not shown in Figure 8;

Figure 13 is a plan view of the flap which closes off the bottom of the floor-sweeping machine of Figures 1 to 12;

Figure 14 is a section taken on line XIV—XIV of Figure 13;

Figure 15 is a plan view of a roller brush of the machine of Figures 1 to 14, partly in section and;

Figure 16 is a section taken on line XVI—XVI of Figure 5.

Referring to the drawings, a floor-sweeping machine 20 has a housing 21 which comprises a substantially rectangular frame 22 and, combined therewith and closing off the top of the sweeper, a cover 23. On the outside, the frame 22 serves to receive a handle bracket 24 on which a stick-like handle 25 is attached to allow a user to cause movement of the floor-sweeping machine over a floor which is to be cleaned. On the inside, the frame 22 accommodates sweeping brushes as well as floor-engaging wheels which serve to support the sweeper for movement over a floor surface and to drive the sweeping brushes. The sweeping brushes to sweep dirt from the floor which is to be cleaned with the sweeping machine, comprise firstly a roller brush 26 the axis of rotation of which extends at right angles to the envisaged direction of movement. To rotate the roller brush 26 in relation to the floor which is to be cleaned, floor-engaging drive wheels 27 are frictionally associated therewith, the wheels 27 being mounted in the housing frame 22 in pairs at both ends of enlarged-diameter end zones 28 of a spindle of the roller brush 26.

Mounting supports which serve at the same time for guiding the drive wheels 27 are formed by pairs of intermediate walls 29 of the frame 22, receiving the wheels 27 between them. The intermediate walls 29 substantially increase the rigidity of the frame 22 which comprises a front web 30, a rear web 31 and two side webs 32, so that the frame 22 with the intermediate walls 29 can be made from relatively thin wall parts, with economy on material. The frame 22 with the intermediate walls 29 is thereby so con-

structed that it can be easily made from synthetic plastics material by injection-moulding. The frame 22 is open at the top and bottom so that only a simple mould is required.

The intermediate walls 29 have on their bottom edges downwardly open bearing housings 33 for stub axles 34 provided on the wheels 27. The stub axles 34 of the wheels 27 are retained by closure covers 35 which at the same time close off the underneath of lateral zones of the frame 22. The closure covers 35 have apertures 36 through which the wheels 27 project and are provided with upwardly-open bearing housings 37 on upright wall parts 38 which co-operate with downwardly-open bearing housings 33 on the intermediate walls 29. During assembly, therefore, the stub axles 34 of the wheels 27 have to be inserted into the downwardly-open bearing housings 33 of the intermediate walls 29 after which the closure covers 35 are fitted. A reliable mounting of the wheels 27 and the frame 22 is thus achieved.

The intermediate walls 29 adjacent the side webs 32 of the frame 22 are connected through integrally-moulded transverse walls 39, 40 to the side webs 32 of the frame 22 or to the intermediate walls 29 provided on the other side of the wheels 27. Thus, the rigidity of the frame 22 is still further increased.

The closure covers 35 are provided with pairs of ratchet arms 42 having ratchet projections 41 and serving for separable connection of the closure covers on the intermediate walls 29 and transverse walls 39. As can be seen particularly from Figure 10, such a pair of ratchet arms 42 is provided at the front end of each closure cover 35, co-operating with the transverse wall 39 connecting the two intermediate walls 29 which accommodate the wheels 27 between them. The pair of ratchet arms 42 thereby receive the transverse wall 39 between them and the ratchet projections 41 are located on the mutually facing sides of the ratchet arms 42 and engage behind the top edge of the transverse wall 39. In order to detach the closure cover 35, the two ratchet arms 42 have to be pressed apart.

Another pair of ratchet arms 42 is provided in the region of the rear end of each closure cover 35. These ratchet arms 42 are provided one on each side of the aperture 36 for the wheels 27 and co-operate with the intermediate walls 29, the ratchet projections 41, as can be seen particularly from Figure 12, being provided on the mutually remote sides of the ratchet arms 42 and co-operating with the intermediate walls 29. To detach the closure cover 35, the free ends of the two ratchet arms 42 must be pressed together.

The closure covers 35 provided at the two laterial zones of the floor-sweeping machine 20 have at their front ends in each case a lateral projection 43 directed towards the middle of the floor-sweeping machine 20. As can be seen particularly from Figure 11, there are on the free ends of the projections 43 in each case a further pair of ratchet arms 42 co-operating with walls 45, 46. The ratchet projections 41 are provided on the mutually remote sides of the ratchet arms 42. Furthermore, between the two ratchet arms 42, a separating wall 47 is provided. To detach closure cover 35, the free ends of the ratchet arms 42 have to be pressed together.

As will be seen particularly from Figures 7 and 10, each bearing housing 33 on the intermediate walls 29 forms, with the associated bearing housing 37 of the respective closure cover 35, an alongated slot 48 inclined with respect to the surface which is to be swept, and of which the end which is adjacent the roller brush 26 is further away from the surface to be swept than is the end which is remote from the roller brush 26. In consequence, when the floor-sweeping machine 20 is pressed downwardly towards the surface to be swept, the wheels 27 are pressed towards the enlarged-diameter end zones 28 of the roller brush spindle, so that the roller brush 26 is frictionally driven as the floor-engaging wheels 27 rotate.

Located one in front of and one behind the roller brush 26 are dirt-collecting chambers 49 into which the dirt brushed up from the floor can be conveyed. The dirt collecting chambers 49 are formed by a flap 50 which forms the bottom of the housing 21 and which is pivotably mounted by a spindle 51. The ends of the spindle 51 are inserted into holes 52 provided in the mutually facing projections 43 of the closure covers 35. When the closure covers 35 are fitted, therefore, the flap 50 is at the same time secured. The flap 50 has an aperture 55 through which the roller brush 26 projects. Since, viewed in the direction of movement of the floor-sweeping machine 20, one dirt-collecting chamber 49 is provided in front of the roller brush 26 and the other dirt-collecting chamber 49 is provided behind it, it is possible during to-and-fro movement over the floor which is to be cleaned, a movement conventional in operation and during which there is in each case a reversal of direction of rotation of the roller brush 26 which is driven by the wheels 27, for dirt brushed up always to pass into one or other of the two dirt-collecting chambers 49, according to the direction of movement.

As can be seen particularly from Figures 13 and 14, the roller brush 26 is mounted to rotate on the flap 50 which can pivot downwardly. For mounting of the roller brush 26, two mutually facing journals 100 are provided on the flap. The journals 100 engage in respective central recesses 101 in the end faces of the roller brush 26. The bearing journals 100 are mounted on upwardly angled end parts 102 of later. projections 103 provided on the flap 50. The lateral projections 103 with the angled end parts 102 are integral with the flap 50 which is made from sheet-metal. The mutually facing bearing journals 100 have stepped ends which are riveted into apertures in the end parts 102.

Thus, it is particularly easy to maintain the bearing journals on the end parts 102 of the projections 103. By the mounting of the roller brush 26 on the flap 50, the roller brush is pivoted out of the housing 21 when the flap 50 is opened, so that cleaning of the brush is facilitated.

The roller brush 26 mounted on the flap 50 is adjustable in height in relation to the housing 21 in which the drive wheels 27 are mounted. For this purpose the flap 50 with the roller brush 26 is, in its closed position, positioned so that its end which is remote from the spindle 51 bears against an abutment 105 (Figure 16) which permits of different height settings. At its end which is remote from the spindle 51, the flap 50 carrying the roller brush 26 has on an upwardly-directed wall part 106 a bearing surface 107 which is inclined in relation to the bottom face of the flap 50. The abutment 105 provided on the housing 21 is displaceable. The bearing surface 107 which extends at an angle to the bottom face of the flap 50 is formed by a tongue 108 which is bent out of the wall part 106 of the flap 50. The bent edge 109 of the tongue 108, which is bent inwards out of the wall part 106, extends at a slight angle in relation to the bottom face of the flap 50.

The abutment 105 provided on the housing 21 is formed by a magnet 110 which co-operates with the bent tongue 108 of the flap 50 which is of sheet-metal. The magnet 110 at the same time holds the flap 50 in the closed position, so that an unintended opening of the flap 50 is prevented. For opening the flap 50, lateral projections 54 are provided at the end remote from the spindle 51, which projections 54 are shaped so that a finger can easily be engaged behind each projection. To open the flap 50, the force of the magnet 110 has to be overcome.

The magnet 110 co-operating with the tongue 108 of the flap 50 is secured to a rail 111 displaceably mounted on the inside of the housing 21, the rail 111 with the magnet 110 being displaceable transversely in relation to the direction of movement of the floor-sweeping machine 20 in use by means of a control member 112 protruding from the top of the housing 21. By displacement of the control member 112, the magnet 110 is moved with respect to the tongue 108 which extends at an angle to the bottom face of the flap 50, so that it is possible to adjust the height of the flap 50 and thus of the roller brush 26 with respect to the housing 21.

The position of the rail 111 which is displaceable by means of the control member 112 provides an indication of the height setting of the roller brush 26 and of the flap 50 with respect to the housing 21 and the wheels 27, a part of the rail 111 being visible through a window 113 in the top of the housing 21. The height adjustment of the roller brush 26 is intended to allow the floor-sweeping machine 20 to be adjusted to suit various depths of pile of carpets which are to be cleaned.
allow the floor-sweeping machine 20 to be adjusted to suit various depths of pile of carpets which are to be cleaned.

Since, due to the width of the mounting supports for the drive wheels, the roller brush 26 can only sweep effectively up to a determined distance from the side wall zones of the floor-sweeping machine 20, the sweeping brushes include auxiliary brushes 56. By means of the auxiliary brushes 56 it is possible to cover those side zones which lie outside the zone of action of the roller brush 26, so that a complete cleaning of a floor is possible in corners and along skirtings and walls.

In the embodiment illustrated, there is an auxiliary brush 56 provided in each of the front corner zones of the floor-sweeping machine 20, the brushes 56 being rotatable about substantially vertical axes, their inverted saucer shaped, i.e. radially outwardly and downwardly directed, rings of bristles overlapping the range of action of the roller brush 26 on the one hand and the side wall and front wall zone of the housing 21 on the other.

For sweepingly effective rotation, the two auxiliary brushes 56 are drivingly coupled to a drive wheel 57 disposed between them. The drive wheel 57 and the two auxiliary brushes 56 are accommodated in a space 58 provided at the front of the floor-sweeping machine, which space 58 is closed by a cover 59. The space 58 is separated from the adjacent dirt-collecting chamber 49 by an intermediate wall 60 which extends parallel with the front web 30 of the frame 20. Thus, the dirt-collecting chambers 49 are together defined by the intermediate wall 60 extending parallel with the front web 30, the inner ones of the pairs of intermediate walls 29 which accommodate the wheels 27 between them, and the rear web 31 of the frame 22. Arcuate boundary walls 98 extend from the intermediate wall 60 to the inner of the intermediate walls 29 below the projections 43. The bristle rings on the auxiliary brushes 56 extend beneath the corner zones covered by the projections 43. The bottom flap 50 which closes off the underneath of the housing does not extend into the range of action of the auxiliary brushes 56.

Extending between the front frame web 30 and the intermediate wall 60 disposed parallel therewith are pairs of intermediate walls 61 in which there are downwardly-open bearing housings 62 to receive bearing projections 65 rigid with the wheel 57.

The cover 59 which has an aperture 66 through which the wheel 57 projects has on both sides of the aperture 66 downwardly-directed pairs of walls 64 aligned with pairs of intermediate walls 61 of the frame 22 and having bearing housings 63 which co-operate with the bearing housings 62 of the pairs of intermediate walls 61.

The wheel 57 has an axial aperture 67 of

non-circular cross-section. Inserted and thus rotationally rigidly connected in this aperture 67 on both sides are correspondingly cross-sectionally shaped ends 68 of a spindle 69 which transmit rotation of the wheel 57 to the auxiliary brushes 56. The spindles 69 which are rotationally rigidly connected to the wheel 57 each mount a respective bevel gear 70 at that one of their ends which is remote from the wheel 57. Each bevel gear 70 co-operates with a bevel gear 71 which is rigid on a gear sleeve 72. As can be seen particularly from Figures 3 and 4, the gear sleeve 72 is rotatably mounted in a part of the frame 22 which is still to be described and extends therein in a substantially vertical direction.

The gear sleeve 72 has a vertical extending aperture 73 which serves to accommodate a journal 74 of the respective auxiliary brush 56. The journal 74 of the auxiliary brush 56 is capable of limited axial movement in the gear sleeve 72 but is rotationally rigidly inserted in the gear sleeve 72. The journal 74 of the auxiliary brush 56, is, for insertion into the gear sleeve 72, provided at its free end with a thickened zone 75 which extends beyond the aperture 73 in the gear sleeve 72, the thickened zone being at the same time formed with an axial slot 76 so that it can be compressed. Upon insertion of the journal 74 of the auxiliary brush 56 through the gear sleeve 72, a spring-action compression of the thickened zone 75 takes place, which zone springs open again, after it has passed through the sleeve, to retain the auxiliary brush spindle in its working position. It should be added that in the present case, the part of the journal 74 which is located between the thickened zone 75 and the actual body of the auxiliary brush 56 is made somewhat longer than the gear sleeve 72, so that, to compensate for irregularities of the floor being swept, a certain axial and thus substantially vertical variation of position of the auxiliary brush 56 is possible.

The cylindrical end of the gear sleeve 72 which is remote from the auxiliary brush body is inserted into a bearing housing formed by a substantially pot-shaped construction 77 in a wall 78. The wall 78 extends horizontally, is accessible before assembly of the machine components, from above and below and is joined to the intermediate wall 60 and an intermediate wall 79 extending between the intermediate wall 60 and the front frame web 30. The horizontally extending wall 78 is particularly easily formed on the frame 22 and still further increases the rigidity of the frame 22. The pot-shaped construction 77 defines a recess which widens out conically towards the auxiliary brush body, the outside diameter of the gear sleeve 72 substantially corresponding to the smallest inside diameter of the conical recess. Provided in the bottom of the pot-shaped construction 77 is an aperture 80 for that end of the journal 74 of the auxiliary brush 56 which protrudes from the gear sleeve 72. By reason of the conical construction of the pot-shaped construction 77, limited pivoting of the gear sleeve 72 and thus of the auxiliary brush 56 is possible in a manner which is still to be described.

The intermediate wall 79 of the frame has a downwardly-open bearing housing 81 for the spindle 69 of the drive wheel 57. The cover 59 which closes off the underneath of the frame 22 has in this area a transverse wall 82 disposed alongisde the intermediate wall 79 in which there there is a downwardly-open bearing housing 81 the said transverse wall 82 having an upwardly-open bearing housing 83, so that a reliable mounting of the spindle 69 connecting the wheel 57 to the auxiliary brush 56 is assured.

A second bearing housing for the gear sleeve 72 is provided in the cover 59. It is formed by an elongated hole 84 (see Figure 2). The length of the elongated hole 84 extends in the direction of movement of the floor-sweeping machine. The elongated hole 84 is thereby so dimensioned that the gear sleeve 72 can be pivoted out of a central position forward and backwards by 1 mm. The end of the gear sleeve 72 which co-operates with the elongated hole 84 is formed by a cylindrical projection 85, an annular shoulder 86 formed adjacent the cylindrical projection 85 of the gear sleeve 72 resting against the cover 59 in which the elongated hole 84 is provided. Thus, the gear sleeve 72 is reliably held between the wall 78 and the cover 59. Assembly is thereby very simple, since it is necessary only to insert the gear sleeve 72 into the pot-shaped construction 77 in the wall 78 and then to fit the cover 59.

The cover 59 which incorporates the elongated hole 84 is provided in the region of the second bearing housing with a downwardly-directed portion which projects into a trough-shaped recess 87 at the rear of the auxiliary brush body 56. This reduces the overall height of the floor-sweeping machine 20.

As already mentioned the spindles 69 have at their ends remote from the wheel 57 the bevel gears 70 which co-operate with the bevel gears 71 of the gear sleeves 72. The bevel gear 70 provided on the spindle 69 has on its back a bearing surface 88 which rests against the intermediate wall 79. In consequence, the bevel gear 70 is, with the spindle 69, likewise reliably secured against axial displacement.

The cover 59 is likewise secured on the frame 22 by pairs of ratchet arms 42 having ratchet projections 41. Pairs of ratchet arms 42 are provided at the end zones of the cover 59 and each pair co-operates with a web 89 formed on the horizontal wall 78 adjacent a recess 90. The ratchet projections 41 are provided on the mutually facing sides of the ratchet arms 42. Further pairs of ratchet arms 42 are provided, one on the right and one on the left of the aperture 66 for the drive wheel 57. These pairs of ratchet arms 42 co-operate with webs 91

formed on the pairs of intermediate walls 61 and rigid with the intermediate walls 60 through securing webs 92. In the case of these pairs of ratchet arms 42 also, the ratchet projections 41 are provided on the mutually facing sides of the ratchet arms 42. To detach the cover 59 from the frame 22, the two ends of the ratchet arms 42 have to be pressed apart. To attach the cover 59, the ratchet projections 41 are provided on their front sides with inclined faces and the webs which co-operate therewith likewise have inclined faces, so that a ratchet connection is achieved by a simple pressing-on process.

Each auxiliary brush has a convex bottom surface 93. These convex surfaces 93 of the auxiliary brushes 56 rest on the floor which is to be swept. As the floor-sweeping machine is moved, the auxiliary brush 56 is thus held by friction onto the floor which is to be cleaned, so that the auxiliary brush 56 pivots rearwards within the elongated hole 84. Thus, with the selected disposition of the ring of bristles, that portion of the bristle ring which is in front, in the direction of movement, is maintained in effective sweeping contact with the surface being swept, while the (in the direction of movement) rearward portion of the bristle ring is lifted off the surface. With the described transmission of drive movement of the wheel 57 to the auxiliary brush 56, the part of the bristle ring which is in effective sweeping contact with the surface at a given time is the region which is moving towards the middle of the floor-sweeping machine 20, so that conveyance of dirt from the marginal zones of the floor-sweeping machine 20 occurs in front of the roller brush 26, by which the dirt is then conveyed into the dirt-collecting chambers 49. Since during the usual to and fro movement of the floor-sweeping machine 20 and the reversal of movement of both the floor-engaging wheels and the sweeping brushes which this entails, accompanied by a simultaneous change in the sweeping area of the auxiliary brushes, it is always that part of the bristle ring which is rotating towards the centre of the sweeper which is in contact with the surface to be cleaned, so that in every phase of movement of the sweeper, dirt located in the lateral zones which are not covered by the brush roller 26 is always conveyed by the auxilliary brushes 56 into a position in front of the main brush 26, so that the auxiliary brushes 56 are always effectively sweeping. By reason of the mirror image disposition of the auxiliary brushes 56 in the two front corners of the sweeper, it is possible, during the sweeping process, to cover on both sides of the sweeper areas of the surface which are not reached directly by the main brush roller.

The open top frame 22 is closed by a cover 23 constituted by a sheet-metal panel. The cover 23 has downwardly-angled front and rear edges 95 which engage in corresponding slots 96 in the frame 22. The cover 23 also has downwardly-angled side edges 97 bearing against the side webs 32 of the frame 22.

As already mentioned, the embodiment illustrated is only a example of how it is possible to implement the invention, which is by no means confined to this embodiment, many other embodiments and variations being possible within the scope of the appended claims.

Having regard to the provisions of Section 9 of the Patents Act 1949, attention is directed to our British Patent No. 1361323.

WHAT WE CLAIM IS:—

1. A floor-sweeping machine, having a housing and a roller brush rotatable by floor-engaging wheels which are mounted in the housing adjacent the ends of the roller brush, the machine in use being moved over a floor to be swept in directions at right angles to the axis of rotation of the roller brush, the housing having on its underside a flap downwardly pivotable relative to the housing about an axis out of rotation of the roller brush, the flap having an aperture therein through which the roller brush projects and forming dirt-collecting chambers located one in front of and one behind the roller brush, with the roller brush rotatably mounted on the flap.

2. A floor-sweeping machine according to claim 1, in which for mounting of the roller brush two mutually facing bearing journals are provided on the flap, which bearing journals engage in corresponding central recesses in end faces of the roller brush.

3. A floor-sweeping machine according to claim 2, in which the bearing journals are provided on upwardly-angled end parts of laterally projecting portions of the flap.

4. A floor-sweeping machine according to claim 3, in which the laterally projecting portions with the angled end parts are integral with the flap which is formed from sheet-metal.

5. A floor-sweeping machine according to claim 3 or claim 4, in which the mutually facing bearing journals have stepped ends which are riveted into apertures in the end parts.

6. A floor-sweeping machine according to any one of claims 1 to 5, in which the roller brush is adjustable in height in relation to the housing.

7. A floor-sweeping machine according to claim 6, in which pivot axis of the flap is at one end thereof and the flap, in its closed position, has its end opposite to said one end held against an abutment on the housing which is movable to adjust the height of the brush.

8. A floor-sweeping machine according to claim 7, in which the flap has at said end opposite to said one end, on an upwardly-directed wall part thereof, a bearing surface which is inclined to a bottom face of the flap.

9. A floor-sweeping machine according to claim 8, in which the bearing surface which is inclined to the bottom face of the flap is formed by a tongue bent from said wall part of

the flap.

10. A floor-sweeping machine according to claim 9, in which the edge of the tongue where it is bent out of said wall part is inclined with respect to the bottom face of the flap.

11. A floor-sweeping machine according to claim 9 or claim 10, in which the abutment provided on the housing is formed by a magnet which co-operates with the tongue, which tongue is of sheet-metal.

12. A floor-sweeping machine according to claim 11, in which the magnet is adjustable transversely to the direction of movement of the floor-sweeping machine by means of control device projecting from the top of the housing.

13. A floor-sweeping machine according to claim 12, in which a part of the control device is visible through a window in the top of the housing and indicates the height setting of the roller brush and of the flap with respect to the housing.

14. A floor-sweeping machine substantially as hereinbefore described and illustrated with reference to the accompanying drawings.

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7 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEET 1

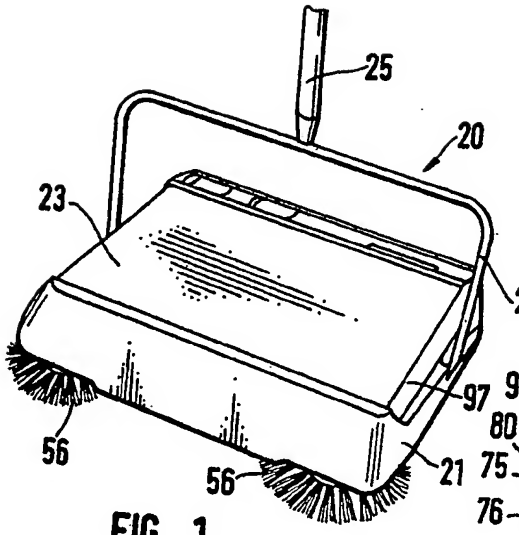

FIG. 1

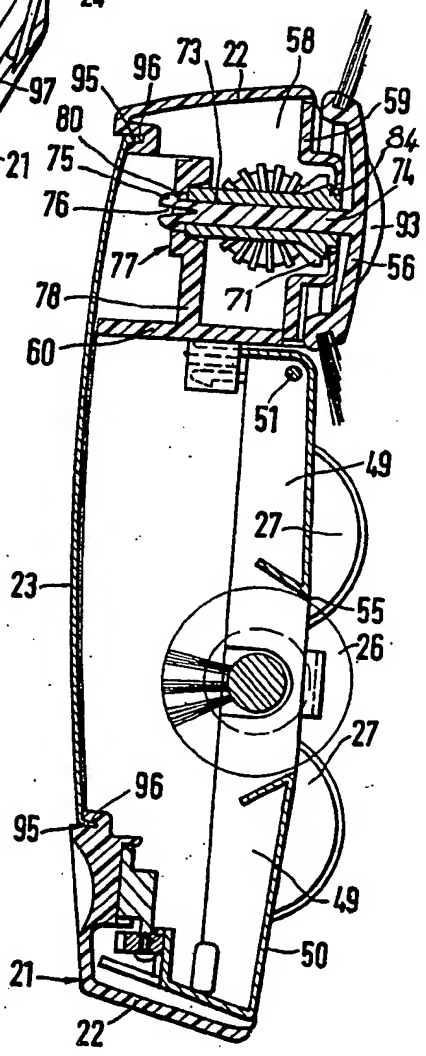

FIG. 3

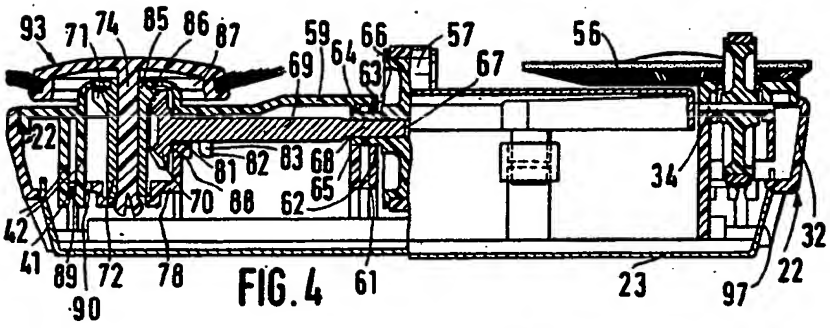
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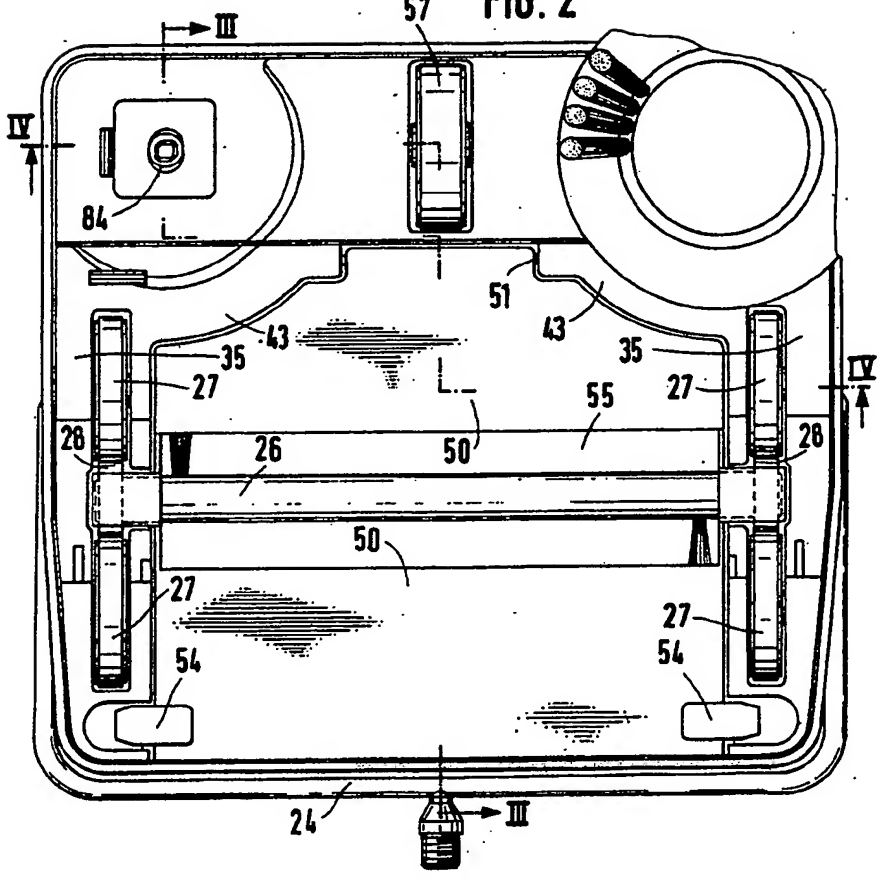
FIG. 4

FIG. 2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III

FIG. 11

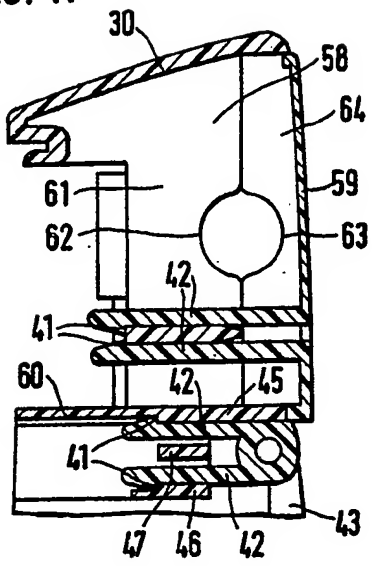


FIG. 12

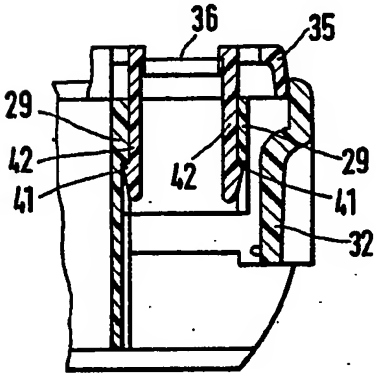
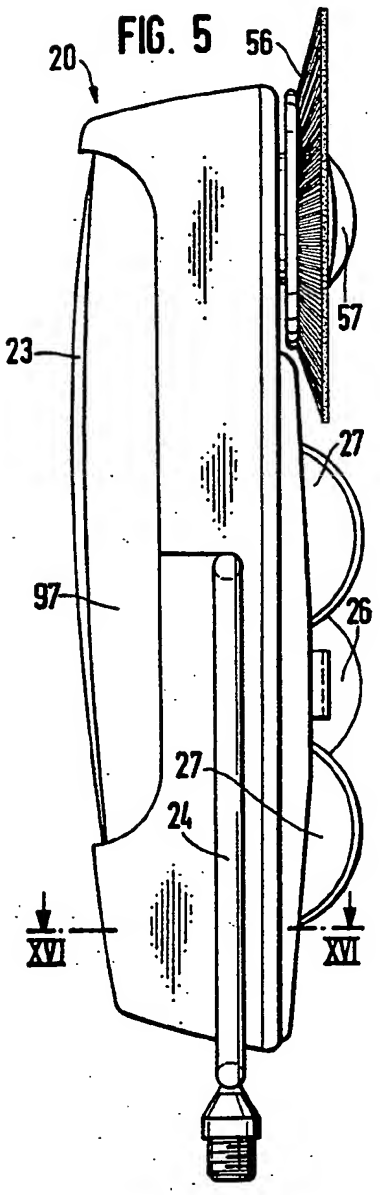


FIG. 5



1 533 494 COMPLETE SPECIFICATION
7 SHEETS This drawing is a reproduction of the Original on a reduced scale.
SHEET 4

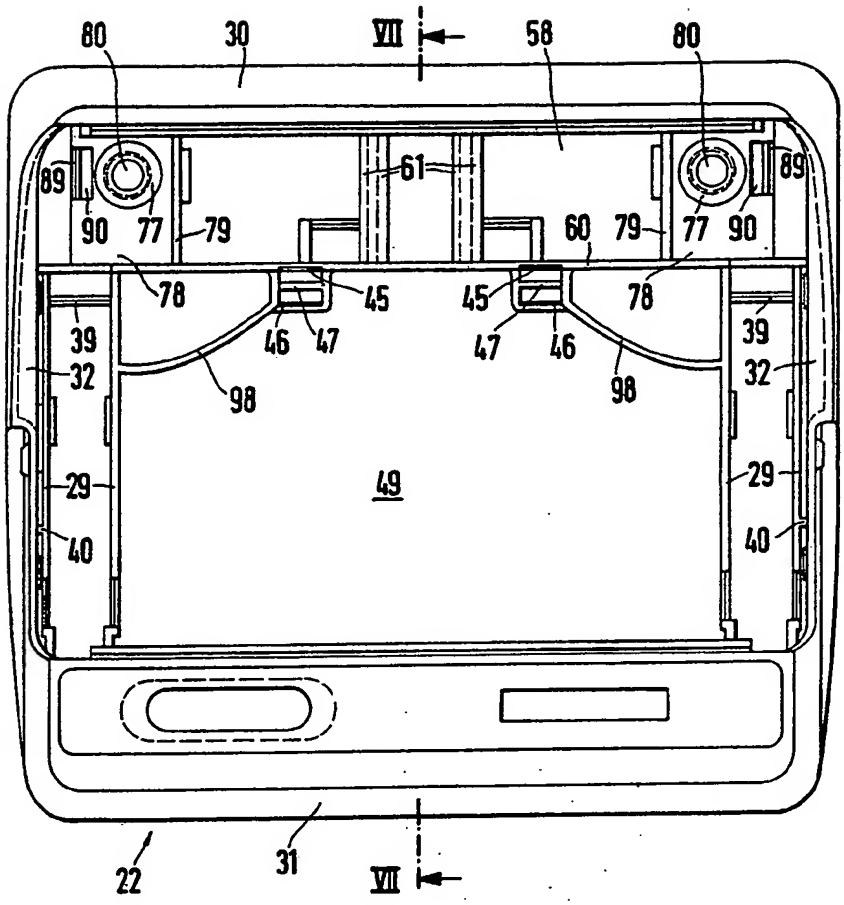


FIG. 6

FIG.7

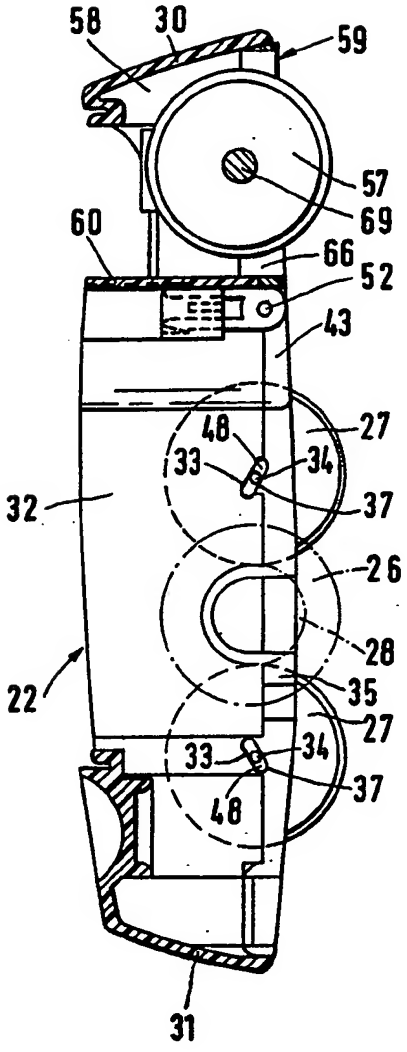

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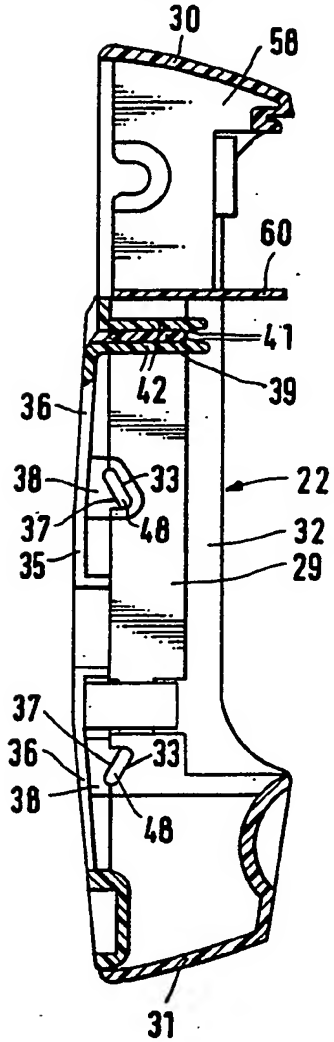
FIG.10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1 533 494 COMPLETE SPECIFICATION
7 SHEETS

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FIG. 9

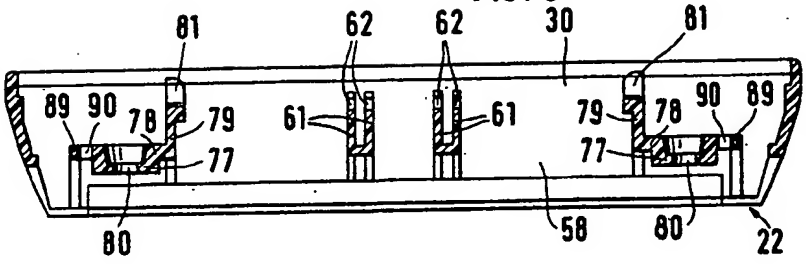
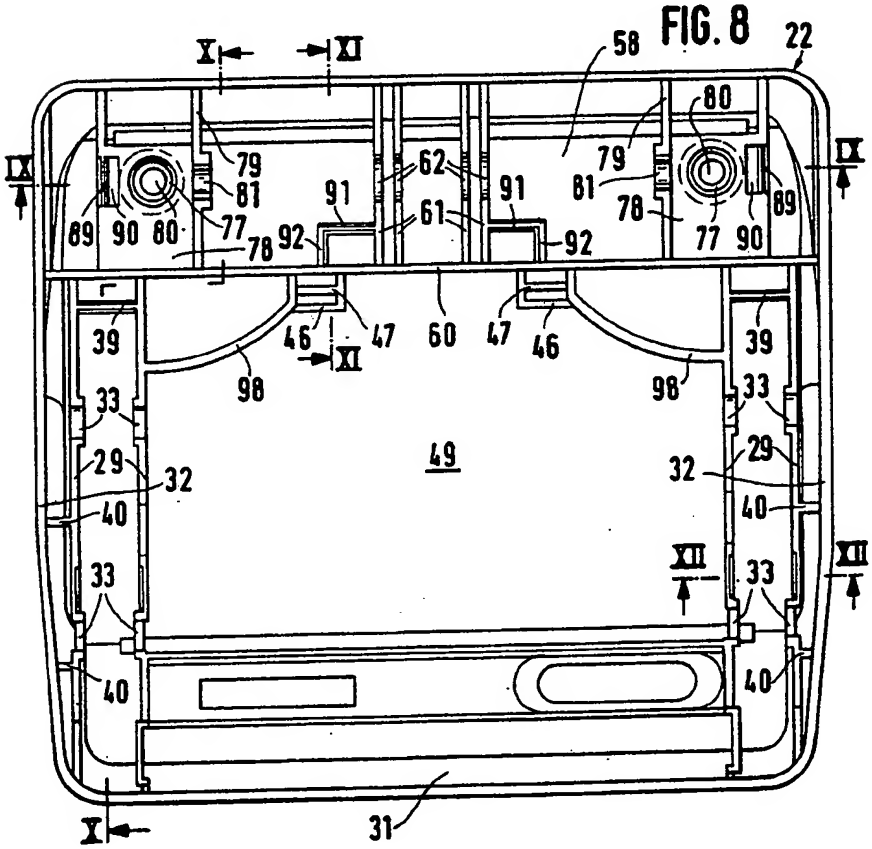


FIG. 8



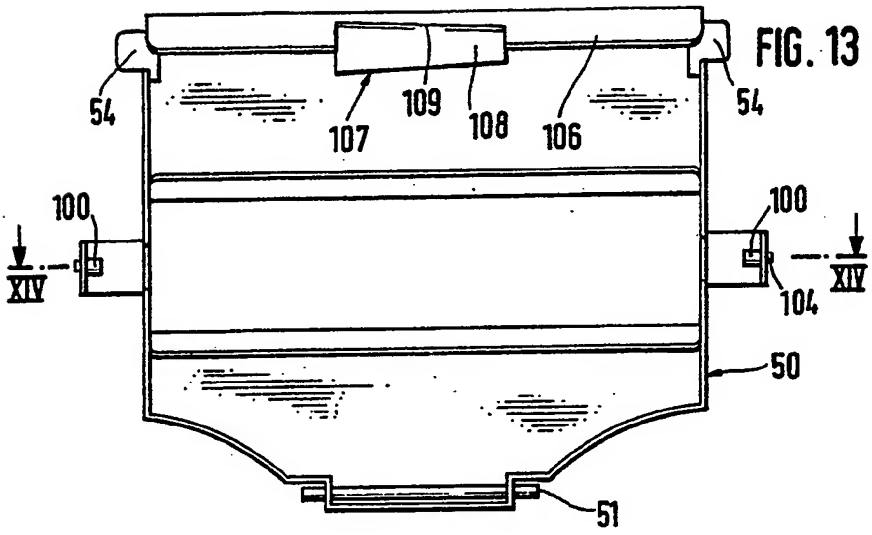


FIG. 13

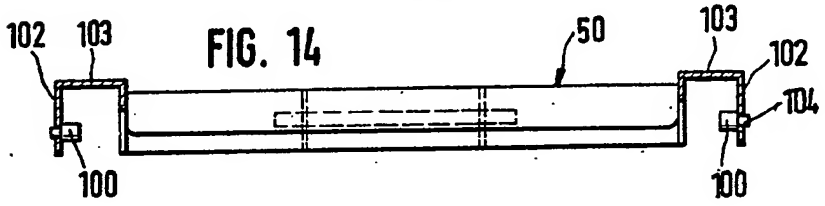


FIG. 14

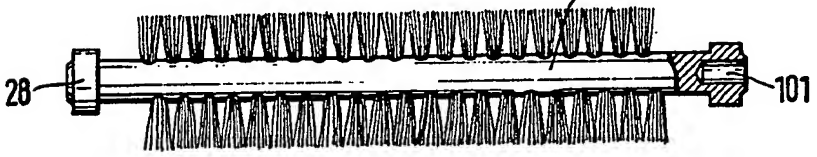


FIG. 15

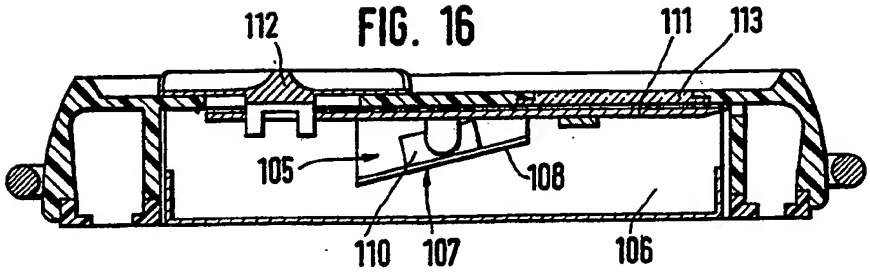


FIG. 16

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